

# Software Product Description

**PRODUCT NAME: DECserver 100, Version 2.0**  
For VMS and MicroVMS

**SPD 27.41.02**

## DESCRIPTION

The DECserver 100 Terminal Server is a network terminal switch for Ethernet Local Area Networks. The DECserver 100 provides a convenient method to logically connect up to eight DIGITAL asynchronous terminals to one or more service nodes (hosts) on an Ethernet. Once the terminal is connected, the user can utilize application programs and utilities as they would through a terminal directly connected to a host via a DZ11, DMF32, or DH11 device with some limitations. Thus, it may be possible to utilize the DECserver 100 to connect all terminals to service nodes in place of traditional interfaces, except for host console terminals.

The DECserver 100 also allows for VMS host initiated connections to asynchronous printers. A special print symbiont on VMS service nodes can initiate connections to asynchronous printers connected to DECserver 100 ports. This allows the printers to be distributed throughout a facility and accessed transparently by service node users. Incoming server connect requests are queued FIFO at the server.

The DECserver 100 implements the Local Area Transport (LAT) protocol for communication with service nodes that implement this protocol on the same Ethernet. This interface has been optimized for high terminal I/O performance over an Ethernet, while reducing host CPU cycles required to handle interrupts. Hence, under most I/O loading conditions, a significant performance gain may be realized by using the DECserver 100 over direct terminal connections via DZ11s.

Software that runs on the DECserver 100 is downline loaded over the network from a Phase IV DECnet load host. Terminal access using the DECserver 100 does not require DECnet running in the same service node; LAT uses the Ethernet addressing mechanism to transport terminal messages.

Features such as login load balancing, multiple terminal sessions, automatic login failover, and remote printer support can lead to greater user productivity.

### Features

#### *Terminal Connection Management*

Through the use of a simple command, users can establish a logical connection, called a session, to any local service node that implements the LAT protocol on

the same Ethernet LAN. This connection makes the terminal appear as if it were physically connected to the service node, and the terminal user can use standard system utilities and applications supported by that node. Each terminal connected to the server can connect to the same or a different service node on the Ethernet. Furthermore, several servers can be used to connect many terminals to one or more service nodes.

A service node can have one or more services that are offered to DECserver 100 users. Services and nodes are identified by name. Users always connect to services, not to nodes, although often one of the service names will be the node name.

In a VAXcluster environment, the DECserver 100 sees each VAXcluster on the Ethernet as a collection of service nodes offering a common service. Each cluster node may also offer a service whose name is equivalent to its node name. In this case, a terminal user can connect either to the cluster service or a service associated with a particular cluster node.

#### *Load Balancing*

When a connection is made to a service, the actual node for the connection is determined by load balancing. Load balancing is a process the server uses when more than one node offers the same service. Service nodes do not have to be configured in a cluster in order for load balancing to be used. Service nodes with the same names may be running different operating systems. Using the load balancing process, the server connects to the node with the highest rating for the service desired. This rating is based on the current loading, memory available, CPU class, and number of users on the nodes that offer the service.

#### *Multiple Sessions*

The DECserver 100 allows each user to establish and maintain up to six sessions to one or more service nodes, up to a maximum of 24 per DECserver 100 depending on the number of nodes in the server database. Only one session can be active at a time. Through simple switching commands, the user can access the different sessions without repeating a login dialog each time. Some operating systems may impose limits on the number of LAT sessions such a host will support.

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### *Local Mode and Service Mode*

For the most part, the environment provided by the DECserver 100 is identical to that the user would experience if attached directly to the service node. When operating in this mode, the user is said to be in Service Mode. Occasionally, such as during connection establishment, the user interacts directly with the DECserver 100. When operating in this mode, the user is in Local Mode.

In Local Mode, the terminal input is interpreted directly by DECserver 100 as commands to be performed by the server.

Local Mode has three different levels of operation: privileged, nonprivileged and secure. Privileged mode is provided for the server manager to control the environment of the server and of the terminal users. Access to this mode is password protected. Nonprivileged commands allow the terminal user to control their service sessions, set terminal characteristics, and show server information. The Server Manager can set the server to secure mode on a per-terminal basis which further limits the commands users can enter to only those which directly relate to the user's own terminal.

The Server Manager environment is a logical extension of the user environment. The Server Manager is treated as a server user with a privileged status. The Server Manager sets a terminal to this status using a command which requires a password. This privileged status allows the Server Manager to enter commands not normally available to server users. These commands set server characteristics, provide control over server port usage, and provide the ability to control the user's access to the server and network services.

In Service Mode, the terminal input is passed directly to the connected service node with several exceptions. One exception, called the local switch character, allows the user to enter Local Mode from Service Mode.

The <BREAK> key may also be used for this function. Other exceptions, called the forward and backward switch characters, allow the user to switch between sessions without the need to enter local mode. The switch characters are disabled by default but may be enabled by command. Both CTRL/S and CTRL/Q are normally interpreted locally but flow control using these characters can be disabled.

### *Autoconnection*

Autoconnection is a function that automatically connects a user terminal to a service node when connection failures occur or upon user login to the server. In conjunction with this function, a dedicated or preferred service can be specified for each terminal user.

If a dedicated service is specified, the DECserver 100 will attempt to connect to that service when a character is typed on the terminal keyboard or when an existing connection fails. In dedicated service mode, only one session is available. As this mode is designed to simulate a direct terminal connection, no local mode commands or messages are available to the terminal

user. Ports with dedicated service can be automatically logged out of the server when the user logs out of the service node.

If a preferred service is specified, the DECserver 100 will attempt to connect to that service as with the dedicated service mode of operation. However, the terminal user can enter local mode and establish other sessions.

### *Automatic Session Failover*

If a service is available on two or more service nodes and a connection to a service fails, the server will attempt to connect the user to another service node offering the same service. Autoconnection must be enabled for this feature to work. The user does not have to be already connected to that service node. Furthermore, the user's context at the time of failure is not automatically restored and login to the new service is required.

### *Groups*

Every terminal and service node in a LAT network is a member of one or more groups, which are specified by a list of numbers from 0 - 127. Groups allow an easy means of subdividing the network into what appears to be many smaller networks. A terminal user is only aware of the services that are offered by nodes in the same group(s).

The Server Manager can specify the authorized group(s) in which a terminal is a member. The authorized groups define the set of services that the user is allowed to access. In addition, a user can further restrict access to services by disabling some of the authorized groups using a non-privileged group command. The user-settable group codes are a subset of the authorized groups.

Groups provide a restrictive view of the network. This restricted view is mainly for user convenience and, although it also provides a form of security, it is not intended to be the primary form of access authorization or system security for a node.

### *Security*

The DECserver 100 provides functions which enhance security features already available in the service nodes. DECserver 100 security includes the ability to lock a terminal's keyboard from other users, optional login protection, and nonprivileged local mode of operation as a default.

A user may lock the terminal using a lock password. This allows the user to leave sessions running at the terminal without fear of security violations. When a terminal is locked, all input from the terminal is ignored until the lock password is re-entered. The lock feature may be disabled by the Server Manager.

Each terminal port can be set to operate in a secure mode which causes all commands that relate to other users to be disabled for that port.

Login passwords can be enabled on a per-line basis by the Server Manager. If enabled, the terminal user must enter a login password to access server functions.

DECserver 100 users normally have access to the nonprivileged local mode. In this mode, users may only issue commands that affect their own terminal environment. The server has a privileged mode for server manager's use. The mode is password protected.

#### *On-line HELP Facility*

A limited on-line HELP facility is available to remind users of command syntax. It is not intended as a replacement for the documentation set.

#### *Directory Service*

Any DECserver 100 user can obtain a directory of services available to that user with a SHOW SERVICES command. Services for which the user is not authorized will not be displayed.

#### *Permanent Characteristics*

The DECserver 100 maintains permanent characteristics in non-volatile memory which is retained even when the power is disconnected. Permanent characteristics are maintained for service and server parameters as well as per-port parameters. Permanent characteristics can be reset to factory default by pressing the software reset button on the hardware unit while plugging in the power cord.

#### *Port Characteristics Configuration*

Characteristics governing the operation of an individual port can be displayed by a nonprivileged terminal user interactively from their terminal. Many of the characteristics may be set-up by the user, but certain characteristics are privileged and may only be changed by the Server Manager.

Port parameters that can be set and displayed include: speed, character size, group codes, parity, terminal type, access, autobaud, and password protection.

#### *Port Access*

A port on a DECserver 100 may be set up in different ways depending on the device attached to the port and its intended use. DECserver 100 supports !RS-232-C asynchronous devices operating at speeds up to 19.2K bps.

Port access is the characteristic which determines how a port may access or be accessed by interactive users and service nodes.

- Access Local - Designed for interactive terminals. This allows the device (typically an interactive terminal) attached to the port to CONNECT to LAT services.
- Access Remote - Designed for applications-driven devices such as asynchronous printers which are allocated by a service node process. This allows the implementation of certain shared printers by multiple service nodes.
- Access Dynamic - Designed for devices (such as personal computers or printers with keyboards) which require both Local and Remote access.

- Access None - Designed to allow the server manager to disable the use of a port.

With printer support capabilities, the setup procedure of remote printers needs to be done once and is automatically reconfigured on system startup. The particular server port must be configured for remote access and set up to match the characteristics of the printer. The system startup command file must be modified to call the two command files provided with the service node software. Finally, the command files themselves must be customized to reflect the environment of their node.

#### *Terminal Operation*

The DECserver 100 software supports the simultaneous operation of up to eight terminals at speeds from 75 bps to 19.2K bps. The software also supports:

- Split speed (transmit and receive) terminal operation
- Block Mode transfers
- Automatic line speed detection
- DIGITAL Personal Computer file transfer
- XON/XOFF handling
- Data transparency mode
- Ability to pass break character and error notification

#### *Terminals Supported*

The DECserver 100 software supports the following DIGITAL terminal devices that have keyboards:

- LA12, LA34, LA35, LA36, LA38,
- VT52
- VT100, VT101, VT102, VT125, VT131
- VT220, VT240, VT241
- VT330, VT340 (session management disabled)

Supported terminal parameters are:

Character size: 7 or 8 bits per character

Parity: Even, Odd, Mark, or None

The Automatic Line Speed Detection (Autobaud) feature is supported for either seven-bit characters with even parity, or eight-bit characters with no parity.

The DECserver 100 software also supports the following DIGITAL Personal Computers (PCs) in both terminal emulation mode and file transfer mode:

- Professional 325, 350, 380
- Rainbow 100A, 100B, 100+
- DECmate II
- DECmate III

**Note:** This product is NOT WARRANTED to support non-DIGITAL terminal devices or personal

computers. However, terminals supporting VT200-like characteristics and personal computers supporting IBM PC, IBM PC/XT, and IBM PC/XT characteristics MAY operate with this product.

#### *Printers Supported*

The DECserver 100 software supports the following DIGITAL asynchronous printers when accessed from VMS and MicroVMS systems:

- LA50, LA100, LA120, LA210
- LQP02, LQP03
- LXY12-DA, LXY22-DA
- LN01S, LN03S, LCP01
- LG01S, LG02
- DTC01, DTC03

#### *Modems Supported*

None. The signals available on each DECserver 100 port connector are Tx, Rx, and Gnd.

#### *Server Management*

Several facilities exist for managing and troubleshooting server operation. The Server Manager in privileged mode can set up server identification information, change port characteristics, or fine tune the operating characteristics of the server. Troubleshooting facilities include diagnostic tests, a remote console feature, and on-line statistics.

A privileged user can diagnose Ethernet communications problems by looping messages to an Ethernet host and through the Ethernet hardware interface at the server. To diagnose terminal problems, users can execute a command to transmit test data to their terminal, or the Server Manager can send test data to any terminal.

The server maintains a variety of statistics and counters. These include the following: Ethernet data link statistics, LAT protocol statistics, and port error statistics. These data can be displayed and zeroed by the Server Manager. Server parameters that can be modified and displayed include the server identification, circuit timer, session limits and login limits.

#### *Remote Server Management*

The DECserver 100 implements the console carrier feature which enables access to the DECserver 100 local mode from a Phase IV DECnet host on the same LAN. With the exception of remote console port configuration, the entire local mode user interface is accessible to the remote console carrier user. This includes the privileged commands, if the user knows the server's privileged password. This capability provides centralized server management and remote server diagnosis.

#### *Communications*

DECserver 100 software is designed to run on DECserver 100 hardware exclusively which includes an Ethernet interface for connection to an Ethernet transceiver cable.

The DECserver 100 has eight EIA RS-232-C/CCITT V.24 asynchronous line interfaces for connecting terminals to the unit. This product is designed for local terminal use only. Support for remote terminals and modem control is not provided.

#### *DECserver 100 Operation*

The DECserver 100 ROM-based firmware provides the necessary maintenance operation protocols for down-line loading DECserver 100 software from a Phase IV DECnet load host over the Ethernet into server memory. All self-test diagnostics are in DECserver ROM, so down-line loading is not a precondition for DECserver self-test. In the event of a bugcheck caused by a fatal error, the unit will normally attempt to up-line dump server memory to a DECnet Phase IV host. Following this, the unit will automatically initialize itself and invoke a down-line load.

#### *DECserver 100 Configuration and Performance*

The process of configuring the DECserver 100 is based primarily on tradeoffs of cost and performance within the realm of satisfying user application requirements. The performance of a given server is a function of the expected network traffic, the load on hosts to which terminals are connected, and resultant processing pursuant to the dedicated function of the unit. Thus performance depends on several factors:

- Number of terminals
- Number of host systems with active connections to the server
- Terminal speeds
- Terminal user applications
- Number and size of host buffers
- Terminal workload

In order to achieve a viable configuration, the user and/or a DIGITAL software specialist should perform a level of application analysis which addresses the factors above. The actual maximum data throughput cannot be calculated by multiplying the number of lines by the line speed, since many factors already discussed in this section may reduce the actual throughput.

#### *Restrictions on DECserver 100 Usage*

While terminal connections using the DECserver 100 have been designed to simulate direct terminal connections as much as possible, a few differences necessarily exist because of the nature of the product. Under most circumstances, these differences are not noticed by terminal users or service node application programs. However, applications which are directly dependent on the following functions may not operate as with a direct connection:

- Applications that depend on reading or setting the terminal speed, character size and parity by manipulating system data structures
- Applications that depend on an extremely fast response time (typically less than 200 ms) to operate

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- Applications that utilize an alternate terminal driver in the service node
- Applications that expect incoming connections to have fixed device names

**HARDWARE REQUIREMENTS**

VAX, MicroVAX or VAXstation configuration as specified in the System Support Addendum (SSA 27.41.02-x).

**SOFTWARE REQUIREMENTS\***

VMS Operating System or MicroVMS Operating System  
DECnet-VAX

**OPTIONAL SOFTWARE\***

None

\* Refer to the System Support Addendum for availability and required versions of Prerequisite/Optional software (SSA 27.41.02-x).

The DECserver 100 software is installed on a VMS or MicroVMS load host, which must contain DECnet-VAX (Phase IV). DECnet is used for down-line loading the server software into the DECserver 100 units.

The DECserver 100 server software will operate with all DIGITAL service nodes which support the LAT protocol.

The DECserver 100 software license applies to the DECserver 100 on which the server software runs, not to service host node CPUs in the network.

Refer to the following SPDs for information on other supported DECserver 100 systems:

DECserver 100 for RSX-11M-PLUS and Micro/RSX (SPD 09.27.xx)

DECserver 100 for ULTRIX-32 (SPD 27.42.xx)

**ORDERING INFORMATION**

Software Licenses: QL-925A\*-\*\*

Software Media: QA-925A\*-\*\*

Software Documentation: QA-925AA-GZ

Software Product Services: QT-925A\*-\*\*

\* Denotes variant fields. For additional information on available licenses, services and media, refer to the appropriate price book.

**SOFTWARE WARRANTY**

Warranty for this software product is provided by DIGITAL with the purchase of a license for the product as defined in the Software Warranty Addendum of this SPD.

**SOFTWARE LICENSING**

This software is furnished under the licensing provisions of DIGITAL's Standard Terms and Conditions. For more information about DIGITAL's licensing terms and policies, contact your local DIGITAL office.

**SOFTWARE PRODUCT SERVICES**

A variety of service options are available from DIGITAL. For more information contact your local DIGITAL office.

# System Support Addendum

PRODUCT NAME: **DECserver 100 For VMS and MicroVMS, Version 2.0**

SSA 27.41.02-B

## HARDWARE REQUIREMENTS

### Processor Support

VAX: VAX 6210, VAX 6220, VAX 6230, VAX 6240,  
VAX 8200, VAX 8250, VAX 8300, VAX 8350,  
VAX 8500, VAX 8530, VAX 8550, VAX 8600,  
VAX 8650, VAX 8700, VAX 8800, VAX 8810,  
VAX 8820, VAX 8830, VAX 8840, VAX 8974,  
VAX 8978

VAX-11/725, VAX-11/730, VAX-11/750,  
VAX-11/780, VAX-11/785, VAX-11/782

MicroVAX: MicroVAX I, MicroVAX II, MicroVAX 2000,  
MicroVAX 3300, MicroVAX 3400,  
MicroVAX 3500, MicroVAX 3600

VAXstation: VAXstation 2000, VAXstation 3200,  
VAXstation 3500

VAXserver: VAXserver 3500/3600/3602

*Not supported:* VAXstation I, VAXstation II

The DECserver 100 software runs on either of the following packaged hardware options:

DSRVA-AA/AB DECserver 100 hardware, including eight EIA RS-232-C/CCITT V.24 asynchronous ports supporting speeds up to 19.2K bps, factory set at 120V/240V.

Use the following SHIELDED cables with each of the physical lines on the DECserver 100 unit:

BC22D Null modem cable for local terminal or printer connections.

BC22R Recommended null modem cable for host systems and other devices, including those which utilize CTS/RTS flow control.

BC17D Null modem cable for host systems and other devices which do not utilize CTS/RTS flow control.

The DECserver hardware requires both a transceiver drop cable and Ethernet connection, H4000 or DELNI, to connect to the Ethernet physical channel.

- VAX workstations are not supported as down-line load hosts.
- All software run on the DECserver is down-line loaded over the Ethernet from a Phase IV DECnet load host.

### Block Space Requirements (Block Cluster Size = 1):

Disk space required for installation: 600 blocks  
(307.2K bytes)

Disk space required for use (permanent): 600 blocks  
(307.2K bytes)

The Block Space Requirements above refer to the disk space required on the down-line load host system disk. The sizes are approximations; actual sizes may vary depending on the user's system environment, configuration, and software options.

### Processor Restrictions

The VAX-11/782 processor is not supported by VMS Operating System V5.0 or later.

## OPTIONAL HARDWARE

None

## CLUSTER ENVIRONMENT

This layered product is fully supported when installed on any valid and licensed VAXcluster\* configuration without restrictions. The HARDWARE REQUIREMENTS sections of this product's Software Product Description and System Support Addendum detail any special hardware required by this product.

\* V5.x VAXcluster configurations are fully described in the VAXcluster Software Product Description (29.78.xx) and include CI, Ethernet and Mixed Interconnect configurations.

## SOFTWARE REQUIREMENTS

VMS Operating System V4.4 - V5.0

MicroVMS Operating System V4.4 - V4.7

DECnet-VAX V4.4 - V5.0

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*VMS Tailoring*

For VMS V5.x systems, the following VMS classes are required for full functionality of this layered product:

- VMS Required Saveset
- Network Support

For more information on VMS classes and tailoring, refer to the VMS Operating System Software Product Description (SPD 25.01.xx).

*MicroVMS Tailoring*

For MicroVMS V4.x systems, the following components of MicroVMS are required for full functionality of this layered product:

- Base System
- Common Utilities
- Program Development

**OPTIONAL SOFTWARE**

Terminal Server Manager V1.0 - V1.2

**GROWTH CONSIDERATIONS**

The minimum hardware/software requirements for any future version of this product may be different from the minimum requirements for the current version.

**DISTRIBUTION MEDIA**

Disk: RX50 Floppy Diskette, RX01 Floppy Diskette, RX33 Floppy Diskette

Tape: 9-track 1600 BPI Magtape (PE), TK50 Streaming Tape, TU58 DECTape II Cartridge

**ORDERING INFORMATION**

Software Licenses: QL-925A\*-\*\*

Software Media: QA-925A\*-\*\*

Software Documentation: QA-925AA-GZ

Software Product Services: QT-925A\*-\*\*

\* Denotes variant fields. For additional information on available licenses, services and media refer to the appropriate price book.

The above information is valid at time of release. Please contact your local DIGITAL office for the most up-to-date information.